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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/756,829

01/14/2004

Robert John Socha

55071-328

2388

20277 7590 03/13/2008
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EXAMINER

MEMULA, SURESH

ART UNIT

PAPER NUMBER

2825

MAIL DATE

DELIVERY MODE

03/13/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/756,829	Applicant(s) SOCHA ET AL.	
	Examiner SURESH MEMULA	Art Unit 2825	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 10 and 11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 10 and 11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to the after-final interview, held 01/22/2008, and remarks filed on 02/15/2008. In view thereof, the 35 USC 102 rejections under Liebchen et al. are withdrawn. However, this application is not in condition for allowance in consideration of the 35 USC 103 rejections detailed below. Claims 1-7 and 10-11 are pending.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. **Claim 1-7 and 10-11 are rejected under 35 U.S.C. 112, second paragraph**, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. In claims 1 and 10, the phrase "of a predetermined order" in "creating an interference map of a predetermined order" renders the claim indefinite because the phrase fails to distinctly identify an order with respect to what, i.e., criticality/size/difficulty/light intensity?
4. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).
5. Claims 2-6 and 11 are rejected for their dependency on rejected base claims 1 and 10, respectively.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims 1-7 and 10-11 are rejected under 35 U.S.C. 103(a)** as being unpatentable over US Patent No. 6,263,299 to Aleshin et al. (Aleshin) in view of:
US Pub. No. 2002/0062206 to Liebchen (Liebchen).

8. Pursuant to claim 1 and similarly recited claim 10, **Aleshin teaches:**
representing at least one resolvable feature of a mask to be printed on the substrate (Column 5, lines 1-2; Column 8, lines 28-32) by at least one impulse function (Column 5, lines 5-18; Column 14, lines 51-55);

creating an interference map of an interference map of a predetermined order (Column 4, lines 61-63; FIG. 4, 8) based on the at least one impulse function and a Hopkins model (Column 5, lines 5-18); and

a program product, machine readable medium, and programmable computer (FIG. 10).

9. Although Aleshin teaches a Hopkins model is utilized in the generation of an aerial image (Column 5, lines 5-18), **Aleshin does not explicitly teach the TCC function itself.**

10. **Liebchen teaches** the Hopkins model is a two-dimensional by two-dimensional transmission cross coefficient function which captures all the effects of the lithographic projection apparatus (Paragraph 0009) including illumination pupil and projection pupil (Paragraphs 0007, 0009; FIG. 1A).

11. **It would have been obvious** to one of ordinary skill in the art at the time of the applicant's invention to have utilized the TCC function of Liebchen (Paragraphs 0007-0009, FIG. 1A) in order to:

- a. more fully detail the composition of the Hopkins model utilized by several commercially available products that calculate aerial images (Liebchen: Paragraphs 0008-0009);
 - b. maintain a reasonable degree of accuracy ((Liebchen: Paragraph 0010)
 - c. implement performing image formation analysis in the frequency space in order to deal with the pupil function of the imaging system (Liebchen: Paragraph 0007); and
 - d. overcome the necessity to superimpose and add the effect of each individual illumination source that makes up the partially coherent source (Liebchen: Paragraph 0009).
12. Pursuant to claim 2 and similarly recited claim 11, placing an assist feature in the mask corresponding to the areas of destructive interference map (Liebchen: Paragraph 0254; Aleshin: Column 4, lines 9-15).
13. Pursuant to claim 3, wherein the assist feature is non-resolvable (Liebchen: Paragraph 0254; Aleshin: Column 4, lines 9-15).
14. Pursuant to claim 4, wherein the interference map models light intensity incident on the substrate (Liebchen: Paragraphs 0003, 0017; Aleshin: Column 4, lines 52-67).
15. Pursuant to claim 5, further comprising placing at least one assist feature on an area of the mask (Liebchen: Paragraph 0254; Aleshin: Column 4, lines 9-15) corresponding to an area on the interference map having a light intensity of a predetermined level (Liebchen: Paragraphs 0001, 0003, 0212, 0240, 0251, 0253-0254) corresponding to the areas of destructive interference (Liebchen: Paragraphs 0001, 0003, 0243).
16. Pursuant to claim 6, wherein the predetermined level corresponds to a resolvable light intensity (Liebchen: Paragraphs 0001, 0003, 0254; Aleshin: Column 4, lines 9-15).
17. Pursuant to Claim 7, wherein the interference map represents change in light intensity incident on the substrate (Liebchen: Paragraphs 0001, 0003, 0017; Aleshin: Column 4, lines 52-67).

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SURESH MEMULA whose telephone number is (571)272-8046. The examiner can normally be reached on Monday-Friday 8:00-4:30. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Chiang can be reached on 571-272-7483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

19. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Suresh Memula
Art Unit 2825
March 3, 2008

/Paul Dinh/

Primary Examiner, Art Unit 2825